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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
GREENE, JASON M	
ART UNIT	**PAPER NUMBER**
1724	

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/733,218	ZELLER ET AL.	
	Examiner	Art Unit	
	Jason M. Greene	1724	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 29 September 2005.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11,15-17,19 and 21-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11,15-17,19 and 21-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 29 September 2005 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Drawings

1. The drawings were received on 29 September 2005. These drawings are acceptable.

Response to Arguments

2. Applicant's arguments, see page 7, lines 20-24, filed 29 September 2005, with respect to the 35 USC 112, second paragraph rejection of claims 2, 8 and 11 have been fully considered and are persuasive. The 35 USC 112, second paragraph rejection of claims 2, 8 and 11 has been withdrawn.

3. Applicant's arguments filed 29 September 2005 regarding the Jha et al. reference have been fully considered but they are not persuasive.

With regard to Applicants' arguments that Jha et al. fails to teach the porous sintered nanoparticle material having pores with a smallest aspect of less than about 200 nm, the Examiner notes that the reference clearly teaches the layer of porous

sintered nanoparticle material having pores with a smallest aspect of 10-100 nm (col. 4, lines 54-60 and col. 12, lines 45-51). While Jha et al. does teach the foam having a pore size greater than the claimed range, the foam serves as the porous base material and does not constitute the layer of porous sintered nanoparticle material. This is especially true since Jha et al. explicitly teaches the porous sintered nanoparticle materials forming a skin (425) on the outer surface of the foam.

With regard to Applicants' arguments concerning claim 10, the Examiner contends that the foam constitutes a "sintered metal base". At col. 5, lines 24-27, Jha et al. explicitly recites the foam being formed from porous nickel. At col. 6, line 63 to col. 7, line 32, Jha et al. recites the foam serving as a base for a metallic powder and the assembly subsequently being sintered. Clearly, the foam of Jha et al. is a sintered metal base.

With regard to Applicants' arguments concerning the LRV of the filter for particles in water, the Examiner obviously agrees with Applicants that water is not a process gas. However, the LRV of the filter for a given particle size will be approximately the same for particles in water as for particles in a process gas since the filter of Jha et al. removes particles by sieving regardless of the type of fluid. As previously noted, the claims are completely silent as to the flow rate or pressure drop at which the claimed LRV is measured. The Examiner recognizes that passing water through the filter of Jha et al. at a given flow rate will clearly lead to a larger pressure drop (and hence a lower LRV)

than passing a process gas through the filter at the same rate of flow. However, since no conditions are specified for the claimed LRV, the Examiner has interpreted the claims as applying to all operable flow rates. Therefore, as previously indicated, the claims are seen as covering the LRV at a very, very low flow rate. Accordingly, even when the process fluid is water, the filter will still exhibit the recited LRV so long as the flow rate of the water does not exceed a certain threshold.

Claim Rejections - 35 USC § 102

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1-3, 5-11, 21-25 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Jha et al.

With regard to claims 1-3, 7, 8, 10 and 11, Jha et al. discloses a filter element comprising a sintered porous composite material comprising a porous base material (the open-pore nickel foam) and a layer (14) of porous sintered nanoparticle material, said layer of porous sintered nanoparticle material on one or more surfaces and penetrating a portion of said porous base material to form a substantially continuous structure, said porous sintered nanoparticle material having interconnected pores with a smallest aspect of less than about 200 nm (10-100nm), wherein the sintered

nanoparticle material comprises nickel in Fig. 1, col. 2, lines 49-56 and col. 3, line 63 to col. 4, line 22, col. 4, lines 54-60 and col. 12, lines 45-51.

The Examiner notes that the term “nanoparticle” has been given its broadest interpretation consistent with the specification. Specifically, the term “nanoparticle” has been interpreted to mean that the particles have a diameter or a largest dimension of less than about 1000 nm, as taught in paragraph 0042 of the instant specification.

Jha et al. explicitly teaches the particles forming the sintered layer having a diameter of less than 1 µm (1000 nm) in col. 2, lines 55-56. Therefore, since Jha et al. explicitly discloses using nickel particles having an average size of less than 1000 nm, the claims are anticipated.

With regard to claim 5, since Jha et al. teaches the sintered porous composite filter element being sintered in a protective nitrogen atmosphere (see col. 7, lines 11-16), the sintered porous composite filter element will comprise nitrogen gas in the pores of the material.

With regard to claims 6 and 9, Jha et al. discloses the sintered porous composite filter element further comprising a housing (212) wherein the sintered porous composite filter element is bonded (welded) to the housing, wherein said housing with the bonded sintered porous composite material is characterized in that it has a sieving LRV of at least 2 for 0.2 µm particles in a fluid in Fig. 2, col. 1, lines 17-18, col. 4, lines 23-41 and col. 9, line 1 to col. 10, line 28. Specifically, Jha et al. teaches the sintered porous

composite filter elements having a sieving LRV of 9 to 9.95 for 0.1 μm particles (the most penetrating particle size) in col. 1, lines 17-18 and col. 9, line 1 to col. 10, line 28. Since the sieving LRV of a sintered porous composite filter element increases as the size of the particles in the fluid increases, the sintered porous composite filter elements inherently have a sieving LRV of at least 9 for 0.2 μm particles in a fluid.

With regard to claims 21, 22, and 28, Jha et al. discloses a filter element comprising a sintered porous composite material comprising a porous base material (the open-pore nickel foam) and a layer (14) of porous sintered nanoparticle (less than 1000 nm) material, said layer of porous sintered nanoparticle material on one or more surfaces and penetrating a portion of said porous base material, said porous sintered nanoparticle material having pores smaller than the pores in said porous base material, said porous composite filter element being characterized in that it has an LRV of at least 2 for a 0.2 μm particles in Fig. 1, col. 1, lines 17-18, col. 2, lines 49-56, col. 3, line 63 to col. 4, line 22, and col. 9, line 1 to col. 10, line 28. Specifically, as noted above, since Jha et al. teaches the sintered porous composite filter elements having a sieving LRV of 9 to 9.95 for 0.1 μm particles, the filter elements will inherently have an LRV of at least 9 for larger 0.2 μm particles. Furthermore, since the claims are silent as to the specific flow rate at which the LRV is determined, the Examiner has assumed that the claims are intended to cover all flow rates up to a maximum flow rate at which the pressure drop across the filter element exceeds a predetermined operational limit. Accordingly, the claims are seen as encompassing very low flow rates at which the filter element will

display higher LRVs. Therefore, the sintered porous composite filter element of Jha et al. inherently has an LRV of at least 4 for a 0.05 μm particle in water.

With regard to claims 23 and 24, Jha et al. teaches the sintered porous composite filter elements having a sieving LRV of 9 to 9.95 for 0.1 μm particles in col. 1, lines 17-18 and col. 9, line 1 to col. 10, line 28.

While Jha et al. does not explicitly recite the LRV of the sintered porous composite filter elements for 0.05 μm particles, the filter element will inherently have an LRV of at least 4 for 0.05 μm particles due to the fine pore structure. Furthermore, since claims 23 and 24 are silent as to the specific flow rate at which the LRV is determined, the Examiner has assumed that the claims are intended to cover all flow rates up to a maximum flow rate at which the pressure drop across the filter element exceeds a predetermined operational limit. Accordingly, the claims are seen as encompassing very low flow rates at which the filter element will display higher LRVs. Therefore, the sintered porous composite filter element of Jha et al. inherently has an LRV of at least 4 for a 0.05 μm particle in water.

With regard to claim 25, Jha et al. discloses the sintered porous composite filter element having a flux of 13.4 slpm/in^2 (2.077 slpm/cm^2) at a pressure drop of 10.5 psi in col. 10, lines 20-28. Therefore, the pressure coefficient can be calculated as 10.5 psi * (1 / 2.077 slpm/cm^2) = 5.06 psi cm^2/slpm, which is less than 250 psi cm^2/slpm. While Jha et al. is silent as to the specific gas used to determine the LRV, the sintered porous

composite filter element will inherently exhibit approximately the same pressure coefficient regardless of the specific gas used, including nitrogen.

6. Claims 15 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Jha et al.

Jha et al. discloses a method for removing material from a fluid comprising flowing a fluid having said material therein through the sintered composite material of claim 1 wherein the sintered composite material removes said material from the fluid in Fig. 1, col. 2, lines 49-56, col. 3, line 63 to col. 4, line 22, col. 4, lines 54-60, col. 9, lines 1-14 and col. 12, lines 45-51.

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jha et al. in view of Zeller.

Jha et al. does not disclose the sintered porous composite material including sintered dendritic nanoparticles.

Zeller discloses using dendritic particles to produce sintered porous composite filter elements in col. 5, lines 5-50.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the dendritic shape of Zeller into the particles of Jha et al. to provide filter elements having a higher pore area, as suggested by Zeller in col. 5, lines 5-12.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jha et al. in view of Subramaniam et al.

Jha et al. teaches the method of claim 15 wherein the fluid is a gas or a liquid in col. 2, lines 32-36.

Jha et al. does not disclose the fluid being a supercritical fluid.

Subramaniam et al. discloses a similar method comprising passing a supercritical fluid through a porous filter to remove material from the supercritical fluid in col. 3, lines 7-59.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the supercritical fluid of Subramaniam et al. into the method of Jha et al. to provide a filtered supercritical fluid having 99.9999999% of particles larger than 0.1 μm removed, as suggested by Jha et al. in col. 1, lines 17-19 and col. 9, lines 1-14.

10. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spiegelman et al. in view of Jha et al.

Spiegelman et al. discloses an apparatus (10) for removing contaminants from a fluid stream comprising a housing (12) for containing a bed material (20), a second filter element (16) that is a sintered porous material having nanometer sized (0.1 μm or 100 nm) pores, said second filter element secured to an inlet end of the housing to permit fluid flow through the apparatus, the bed material, and the second filter element, said second filter element removing particles from the fluid stream, a bed of material (20) covering said second filter element and contained within said housing, said bed removing contaminants from said fluid stream, and a first filter element (18) secured to the housing that retains the bed material within the housing between the first filter element and the second filter element, said first filter element permitting fluid flow through the apparatus in Fig. 1 and col. 3, line 22 to col. 4, line 64.

Spiegelman et al. does not disclose the second filter element being a sintered porous composite material.

Jha et al. discloses a filter element comprising a sintered porous composite material comprising a porous base material (the open-pore nickel foam) and a layer (14) of porous sintered nanoparticle material in Fig. 1, col. 2, lines 49-56 and col. 3, line 63 to col. 4, line 22.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the sintered porous composite material of Jha et al. into the second filter element of Spiegelman et al. to provide a filter element having increased mechanical strength and lower pressure drop, as suggested by Jha et al. in col. 2, lines 22-36.

11. Claim 26 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Jha et al.

While Jha et al. does not explicitly disclose the sintered composite filter element operating at a pressure differential across the material of greater than 50 psi, the filter element will inherently be able to withstand such a pressure drop since it is formed from sintered metallic particles bonded to a porous metallic base material.

Alternatively, one of ordinary skill in the art at the time the invention was made would have recognized that the filter element could have been designed to support pressure drops in excess of 60 psi since Jha et al. explicitly teaches producing the filter element to have high mechanical strength in col. 2, lines 22-36.

12. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jha et al.

Jha et al. teaches the thickness of the porous sintered nanoparticle material layer being 0.01 inch (254 microns) or less in col. 5, lines 38-40.

The Examiner notes that the prior art range of a thickness of 254 μm or less is seen as overlapping the claimed range of less than 100 μm. Therefore, a prima facie case of obviousness exists which must be overcome through a showing of unexpected or unobvious results. See MPEP 2144.05.

Conclusion

13. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Greene whose telephone number is (571) 272-1157. The examiner can normally be reached on Monday - Friday (9:00 AM to 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on (571) 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Greene
Examiner
Art Unit 1724

1/23/06

jmg
January 23, 2006